

IN THE CLAIMS:

Claim 1. (Cancelled)

Claim 2. (Currently Amended) A method as claimed in claim 13 wherein the [step (b)] sensing comprises [substeps of]:

[b1)] generating and transmitting a laser beam to the structure;

[b2)] receiving [the] a reflected laser beam from the structure;

[b3)] detecting Doppler shift in the received laser beam relative to the transmitted laser beam; and

[b4)] calculating [determining] at least one of [the] a peak displacement and velocity of the vibration, based on the Doppler shift detected [detecting of the substep (b3)].

Claim 3. (Currently Amended) A method as claimed in claim 13 wherein the sensing [of the step (b)] is performed by sensing peak displacement of the vibration from at least one portion of the structure.

Claim 4. (Currently Amended) A method as claimed in claim 13 wherein the sensing [of the step (b)] is performed by sensing peak velocity of the vibration from at least one portion of the structure.

Claim 5. (Currently Amended) A method as claimed in claim 13 wherein the [step (b)] sensing comprises optically sensing vibration from different portions of the structure corresponding to similar elements of the structure, the method further comprising:

[d)] comparing the vibrations from the different portions of the structure; and

wherein the determining [of step (c) performed] is based on the result of the comparing [of the step (d)].

Claim 6. (Currently Amended) A method as claimed in claim 5 wherein the comparing [of the

step (d)] is performed based on peak displacement of the vibrations.

Claim 7. (Currently Amended) A method as claimed in claim 5 wherein the comparing [of the step (d)] is performed based on peak velocity of the vibrations.

Claim 8. (Currently Amended) A method as claimed in claim 13 wherein the sensing [the step (b)] is performed with a laser vibrometer.

Claim 9. (Currently Amended) A method as claimed in claim 13 wherein the sensing [the step (b)] is performed with a Doppler laser vibrometer.

Claim 10. (Currently Amended) A method as claimed in claim 13 wherein the determining [the step (b)] is performed with a computer.

Claims 11-12 (Cancelled)

Claim 13. (Currently Amended) A method [as claimed in claim 1 wherein the step (c) comprises] comprising:

vibrating ground proximate a structure resting on the ground by driving a vehicle over spaced objects to vibrate the structure, the structure being a house or building;
optically sensing vibration from the structure without contacting the structure; and
determining whether a fault exists in the structure, based on the optically-sensed vibration.

Claims 14-23 (Cancelled)

Claim 24. (Currently Amended) A method as claimed in claim 13 wherein the [performance of the step (c)] determining determines that the fault exists in the structure, the fault being damage of a structural element.

Claim 25. (Previously Amended) A method as claimed in claim 24 wherein the structure element comprises at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist,

wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 26. (Currently Amended) A method as claimed in claim 13 wherein the [performance of the step (c)] determining determines that the fault exists in the structure, the fault being deterioration of a structural element.

Claim 27. (Previously Amended) A method as claimed in claim 26 wherein the structure element comprises at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 28. (Currently Amended) A method as claimed in claim 13 wherein the [performance of the step (c)] determining determines that the fault exists in the structure, the fault being a dislocation or separation between structure elements normally joined.

Claim 29. (Previously Amended) A method as claimed in claim 28 wherein the structure elements each comprise at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 30. (Currently Amended) A method as claimed in claim 13 wherein the [performance of the step (c)] determining determines that the fault exists in the structure, the fault being an improper joining of structure elements.

Claim 31. (Previously Amended) A method as claimed in claim 30 wherein the structure elements each comprise at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 32. (Currently Amended) A method comprising [the steps of]:

[a)] first optically sensing vibrations at spaced portions of a structure to produce a first set of vibration data readings;

[b)] establishing base line data from the first set of vibration data readings for respective

spaced portions of the structure;

[c)] at a time after completion [of performance] of the first sensing [of the step (a)], optically sensing vibrations at the spaced portions of the structure to produce a second set of vibration data readings;

[d)] comparing the second set of vibration data readings [of the second set] with the corresponding [vibration data readings of the first set constituting the] base line data to generate comparison result data; [and]

[e)] determining whether a fault exists in the structure at the time of the second sensing [performance of step (c)], based on the comparison result data [of the step (d)]; and
vibrating the structure by driving a vehicle over spaced objects to produce the vibration
sensed in at least one of the first or second sensing.

Claim 33. (Currently Amended) A method as claimed in claim 32 wherein the [step (a)] first sensing comprised [substeps of]:

[a1)] generating a laser beam and transmitting the laser beam to the structure;
[a2)] receiving the laser beam from the structure, the received laser beam shifted in phase relative to the transmitted laser beam due to vibration of the structure;
[a3)] detecting the phase shift in the received laser beam; and
[a4)] determining at least one of the peak displacement and velocity of the vibration, based on the detecting [of the substep (a3)].

Claim 34. (Currently Amended) A method as claimed in claim 32 wherein the [step (c)] second sensing comprised [substeps of]:

[c1)] generating a laser beam and transmitting the laser beam to the structure;
[c2)] receiving the laser beam from the structure, the received laser beam shifted in phase

relative to the transmitted laser beam due to vibration of the structure;

[c3)] detecting the phase shift in the received laser beam; and

[c4)] determining at least one of the peak displacement and velocity of the vibration, based on the detecting [of the substep (c3)].

Claim 35. (Currently Amended) A method as claimed in claim 32 wherein the comparing [of the step (d)] comprises comparing vibration data readings [sensed in the steps (a) and (c)] from different portions of the structure corresponding to similar elements of the structure.

Claim 36. (Currently Amended) A method as claimed in claim 32 wherein the comparing [of the step (b)] is performed based on peak displacement of the vibrations.

Claim 37. (Currently Amended) A method as claimed in claim 32 wherein the comparing [of the step (b)] is performed based on peak velocity of the vibrations.

Claim 38. (Currently Amended) A method as claimed in claim 32 wherein the [step (a)] sensing is performed with a laser vibrometer.

Claim 39. (Currently Amended) A method as claimed in claim 32 wherein the [step (a)] sensing is performed with a Doppler laser vibrometer.

Claim 40. (Currently Amended) A method as claimed in claim 32 wherein the [step (b)] establishing is performed with a computer.

Claim 41. (Currently Amended) A method as claimed in claim 32 wherein the [step (d)] comparing is performed with a computer.

Claim 42. (Currently Amended) A method as claimed in claim 32 wherein the [step (e)] determining is performed with a computer.

Claims 43-53 (Cancelled)

Claim 54. (Previously Amended) A method as claimed in claim 32 wherein the structure is a

building.

Claim 55. (Previously Amended) A method as claimed in claim 32 wherein the structure is a house.

Claim 56. (Currently Amended) A method as claimed in claim 32 wherein the [performance of the step (b)] determining determines that the fault exists in the structure, the fault being damage of a structural element.

Claim 57. (Previously Amended) A method as claimed in claim 56 wherein the structure element comprises at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 58. (Currently Amended) A method as claimed in claim 32 wherein the [performance of the step (b)] determining determines that the fault exists in the structure, and the fault is deterioration of a structural element.

Claim 59. (Previously Amended) A method as claimed in claim 58 wherein the structure element comprises at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 60. (Currently Amended) A method as claimed in claim 32 wherein the [performance of the step (b)] determining determines that the fault exists in the structure, and the fault is a dislocation or separation between structure elements normally joined.

Claim 61. (Previously Amended) A method as claimed in claim 60 wherein the structure elements each comprise at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claim 62. (Currently Amended) A method as claimed in claim 32 wherein the [performance of the step (b)] determining determines that the fault exists in the structure, and the fault is an

improper joining of structure elements.

Claim 63. (Previously Amended) A method as claimed in claim 62 wherein the structure elements each comprise at least one of a foundation, roof, ceiling, floor, wall, beam, column, support, joist, wall panel, wall frame, window, window frame, duct, plumbing, piping, or hangar.

Claims 64-93 (Cancelled)